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ABSTRACT

Evidence gathered through interviews with members of trade associations, unions, professional societies, business, and industry as well as data obtained from the Department of Labor, congressional testimony, and publications of the commerical and trade press reveals that the shortage of skilled workers in America is reaching crisis proportions. Among those areas facing acute worker shortages are the health care industry, high technology occupations, the machine tool industry, and office occupations. In order to solve this skills shortage, federal efforts should focus on a long-term plan for building the capacity of each state and each community to prepare citizens for permanent jobs in the private sector. Especially important is building the capacity to prepare skilled workers in depressed communities. Because vocational educators are the ones who train workers for occupations in which shortages are most pronounced, they should be especially concerned about alleviating skill shortages through customized training, adult education, and apprenticeship programs. When forming a national employment and training policy, government and industry planners should consider the following needs areas: keeping vocational programs current with changing industry requirements, organizing an adult employment and training service, and developing emergency defense and economic revitalization training programs. (MN)

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"Since people represent the principal input of an advanced economy, and since their contributions will vary according to their endowment, their developmental opportunities and their motivation, the nation should pursue policies aimed at strengthening its human resources." (Ginsberg, Eli, & Vojta, George J., 1981)

Economists have long contended that a trained workforce is essential for any industrialized nation. In his work, Inquiry into the Nature and Causes of of the Wealth of the Nations, first published in 1776, Adam Smith devotes the first 100 pages to explaining why the key to the wealth of any nation is a well-trained, specialized labor force. It is a fact that has not changed in the intervening 200 years.

This report was developed to inform members of Congress and the media of the dimensions of the skilled worker shortage in America. This is a crisis which threatens this country's industrial and military base as surely as the shortage of capital or tangible goods.

It is difficult to document shortages definitively. There is no system of centralized planning that allows us to produce empirical evidence of the shortages. Yet the evidence is mounting each day to prove that the problems are real.

This report is based on information gleaned through interviews conducted with members of trade associations, unions, professional societies, businesses and industry. In addition, data were gathered from the Department of Labor, testimony before Congress and publications of the commercial and trade press.

The report does not attempt to take into account the full range of shortages in this nation's workforce, but concentrates on those occupations for which vocational training is a prerequisite. The occupations chosen were selected because there have been widespread reports of the existence of severe shortages.

I THE SHORTAGES OF SKILLED WORKERS

It is no secret that the contemporary workplace is undergoing fundamental changes as the result of technological advances. The computer is perhaps the best example of the impact created by such advances. It has been 25 years since the first computer was put into use in the office. At that time, a computer scientist for IBM speculated that "a dozen or so" computers could handle the needs of offices across the country. The fact that there are some 50,000 computers operating in this country today indicates how fast technology can change. (Cougar, J. Daniel, & McFadden, Fred R., 1981)

The computer is changing the nature of the workplace from the assembly line to the corporate office. Small firms as well as large firms are finding that the computer is a cost-effective investment. What's more, in today's society, information is now the central commodity of the workplace. Having a more efficient means to collect, store and process information requires workers adept in these processes. It is estimated that today 45 to 55 percent of the workforce is in the information business. By the year 2000, it is projected that figure will rise to 80 percent.

With the transition to an information society, high technology fields--computers, semi-conductors and telecommunications--have become growing industries. "High technology is as much a resource for this country as oil in the ground is for Saudi Arabia," declares Sidney Topol, Chairman and chief executive officer for Scientific Atlanta, Inc., the world's leading producer of satellite earth stations. As high technology grows, technical workers will be needed with backgrounds in microelectronics, digital technology, computer-aided designs and manufacturing, robotics, laser technology and other fields.

High technology industries have helped make the United States the world's leading nation in technology, science and engineering. But competition from abroad is increasing at an alarming rate. From 1967 to 1976, for example, Germany's output per person hour was three times that of the United States and Japan's was almost five times. (Weinschel, Bruce, 1979).

Three out of four jobs in the 1980s will require technical training below the baccalaureate level, according to the Bureau of Labor Statistics. Yet more students than ever are dropping out of science and mathematics after the tenth grade, eliminating themselves from technical careers, according to a recent report by the National Science Foundation, Science and Engineering for the 1980s and beyond.

As these trends suggest, there is a growing mismatch between the needs of the workplace and the skills of U.S. workers.

These trends suggest other dangers to William W. Winpisinger, president of the Machinist Union and vice president of the AFL-CIO. "The mostt highly industrialized nation on earth", says Winpisinger, "is in danger of becoming a nation of industrial illiterates who do not know how to stop a running toilet, replace a burnt-out fuse or identify anything on a car more complicated than the gas tank."

The index of help-wanted advertising offers proof of the mismatch between the needs of the workplace and the skills of U.S. workers. The index is a sea-

sonally adjusted measure based on the number of help-wanted advertisements printed in the classified ad section of leading newspapers in major employment areas. While unemployment remained at 7.6 percent during both May, 1980 and 1981, the help-wanted index increased from 112-118. Simply, put, more job openings were reported but unemployment did not go down.

The shortage of skilled workers is documented by the Department of Labor in a publication entitled The Forecasting of Manpower Requirements. The publication projects a shortage of persons adequately trained in certain professional and technical occupations, including:

- A shortage of subprofessional workers to serve as technicians, laboratory assistants, foremen and supervisors.

- A shortage of craftspeople and skilled workers such as machinists, mechanics, machine repairpersons, electricians and plumbers.

- A shortage of stenographers, bookkeepers and skilled office machine operators.

- A great number of unskilled and semi-skilled workers in cities, creating widespread unemployment and underemployment.

More and more associations representing various trades are reporting shortages that concur with these trends projected by DOL.

The Associated General Contractors (AGC) report that the U.S. is not replacing retiring journeymen in the commercial construction trades, an industry which employs three out of every ten skilled workers in America. According to John Heffner, AGC assistant director of manpower and training, there are shortages of carpenters, electricians, operating engineers and pipefitters.

"There is a skills shortage in the manufacturing industry, particularly that part of the market related to the electronics industry," says William N. Bartolene, associate director of human resources and equal opportunity for the National Association of Manufacturers. "Students come out of the school system with no employability skills and have to be completely retrained by industry," he notes.

Ronald Pilenzo, president of the American Society for Personnel Administration, confirms that there is a "dire need for skilled people that will not disappear." Employers will have to seek creative ways to staff their organizations where these critical shortages exist, Pilenzo says.

"Companies will have to broaden their recruiting market, which increases costs, and salaries must also rise to be competitive. If you can't find people who are trained on the outside, you'll have to invest heavily on training on the inside," Pilenzo advises employers.

As Pilenzo warns, the pirating of skilled workers has already begun. In the Washington area, some hospitals are offering a $200 "finder's reward" to anyone who recruits a nurse. Three Lockheed divisions have programs paying employees as much as $1,000 for referring engineers and other hard-to-find technicians to personnel offices.

In a 1978 issue of Business Week, an article describes the perks and amenities that companies are increasingly forced to offer in order to compete for high technology talent. The Rolm Corp., the fastest growing producer of electronic switchboards, has spent more than $1 million on sports facilities at its new headquarters complex in Santa Clara, Calif. William Jacobson, developer of a $10 million private athletic club in Santa Clara, reports that 30 percent of the memberships are being bought by local businesses for employee recreation and incentives for workers.

Approaching Catastrophic Proportions

There are a number of factors that make it evident that the shortages of skilled workers will only grow worse in the years to come, approaching catastrophic proportions.

The workforce in this country is aging. The average age of tool and die workers is 47. Forty percent of the nation's engineers are 40 or more years of age. The 65 and over group is growing about twice as fast as the population of the nation as a whole. By 1990 there will be about three million more people at the high end of the spectrum--75 and older--than there are today.

The post-baby boom generation will provide fewer workers to fill openings due to retirement. During the 1980's, there will be a sharp drop in the growth of the labor force from the current 2.3 percent rate to 1.1 percent. According to the Department of Labor, the number of people in the labor force aged 16 to 24 will have decreased by about 16 percent and the fraction of the total labor force comprised by this group will have fallen from 23.9 percent to 18.4 percent.

Another trend that will affect the need for skilled workers is the nation's need to increase energy production. Over the next several years, as new energy policies are formulated, workers versed in a variety of technologies will be needed.

According to the Congressional Budget Office, under 1980 assumptions, an additional 72,000 jobs directly related to energy production will be created by 1990. As the chart on the following page shows, a significant proportion of the energy industry's workforce will be made up of skilled craft workers and operatives.

The massive build-up of the nation's defense proposed by the Reagan Administration will only intensify the competition for skilled workers. A recent report by the House Committee on Armed Services asserts that "manpower shortages penetrate deeply into the lower tiers of the industrial base." There are shortages in the number of skilled production workers, machinists, electronic technicians, tool and die makers, test technicians, optical personnel and skilled assemblers. It is clear that in the absence of adequate supplies of these workers, "the defense industrial base will continue to exhibit symptoms of failing health," says the report. The lead time for production of one aircraft engine has gone from 19 to 41 months.

The skilled labor crunch also has an effect on the readiness of the military. "Employers are raiding the military for skilled technicians," says Lester C. Thurow, professor of economics and management at the Massachusetts Institute of

U.S. ENERGY CONSUMPTION

	1977 (actual)	1990 (projected)
Coal	14.7	28.1
Natural Gas	17.9	18.6
Petroleum	37.7	46.4
Nuclear	2.2	13.3
Electricity	22.5	46.0

SOURCE: ENERGY REVIEW, Summer 1977, Data Resources, Inc.

OCCUPATIONAL OUTLOOK IN ENERGY INDUSTRIES FOR SKILLED CRAFT WORKERS AND OPERATIVES

	Percent of Industry Workforce
Electrical Utilities	
Electricians and apprentices	6
Electric power line installers and repairers	19
Mechanics, repairers and installers	7
Truck Drivers	3
Gas Utilities	
Electricians and apprentices	3
Mechanics, repairers and installers	12
Boilermakers	3
Transport equipment operators	4
Power Plants	
Pipefitters	24
Electricians	17
Boilermakers	9
Carpenters	8
Truck Drivers	3
Coal Mining	
All operators, except transportation	41
Transportation equipment operators	9
Mechanics, repairers and installers	9
Electricians and apprentices	4
Oil and Gas Exploration and Drilling	
Earth Drillers	8
Heavy equipment mechanics	4
Truck drivers	5
Welders and flame cutters	2
Oil Refining	
Mechanics, repairers and installers	6
Plumbers, pipefitters and apprentices	3
Machinists and apprentices	2
Welders and flame cutters	2

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics

Technology. The Armed Forces find that they cannot maintain their equipment because they have lost their skilled blue collar workers.

It is sometimes suggested that existing unemployed persons could be moved into these jobs. But as the House Armed Services Committee observes, training takes time. As in World War II, the House Panel declared that "the solution to this national problem will require a national commitment." Unlike World War II, however, today's manpower shortages will not respond to a "quick fix" solution. As the House committee observed:

> Today...you can't just take someone off a farm or out of a kitchen and expect him or her to build aircraft engines. The technology is too advanced, the tolerances too tight, the equipment too sophisticated. It takes three years for a machinist apprentice to complete his rigorous course. It takes the better part of a year to retrain someone from producing autos, for example, to work in high technology aerospace parts. (House Committee on Armed Services, December, 1980, p. 15.)

Developing skills of the American people remains one of the greatest challenges facing our nation. A $1.4 trillion investment in sophisticated machinery and weapons will not solve the defense needs of our nation if we do not have trained people to build, operate, and maintain this equipment. Right now, as noted above, we do not have these people. We also lack a policy that will enable us to develop the skills of our citizens to fill these roles.

Industry Speaks Out About Needs

A growing number of articles about America's skilled shortages are appearing in the popular press and more and more industry representatives are speaking out about the critical needs in their particular fields. Let us consider just a few of the recently reported shortages in four areas where problems are especially serious.

Health Care Industry

The shortage of nurses in this country is "a massive and pervasive problem," according to the American Hospital Association. Recruitment and retention have become key concerns for hospitals across the country as they struggle to fill growing shortages in their workforces.

According to J. Alexander McMahon, president of the American Hospital Association (AHA), "AHA member hospitals indicated they they have between 90,000 and 100,000 vacancies."

McMahon said that data from state hospital associations confirmed the shortage of nurses--and a recent survey showed that every state was affected. He cited these examples:

- "California indicated a 17 percent vacancy rate for full-time budgeted positions in hospitals, while Texas reported that more than 12 percent of the budgeted positions were unfilled."

- "Virginia and Tennessee responded that hospitals in those states had been

forced to close beds--127 in the City of Memphis (Tenn.) hospital system alone--in recent months due to the impossibility of obtaining sufficient nurses to provide adequate care."

- "Georgia reported that one of eight full-time budgeted positions in the state's hospitals was vacant, and yet there were over 500 vacancies in schools of nursing this academic year."

Some 60,000 licensed practical nurses will be needed each year through 1990, reports the U.S. Department of Labor.

Sammy Griffin, president of the National Federation of Licensed Practical Nurses, attributes the shortage of licensed practical nurses to such factors as low pay scales, excessive responsibility and inconvenient work shifts.

Griffin said that recently there have been small declines in admissions to nursing programs as the public gets a better awareness of the problems faced by nurses.

The growing shortages of licensed practical nurses has caused hospitals to hire nonlicensed persons to perform nursing functions. Moreover, LPNs are affected by a shortage of registered nurses, since they are often required to perform additional duties to take up the slack.

The shortage of nurses could become even more pronounced if a proposal by the American Nurses Association becomes law. ANA has proposed discontinuing certification for LPNs, and revising the status of associate degree nurses to that of technical assistants working under the supervision of registered nurses.

According to the National Advisory Council on Vocational Education, such licensing changes could escalate training costs by 39.5 percent in 1981 and 57 percent by 1985. These changes could serve as a further disincentive to persons entering the profession.

The aging of the workforce will precipitate the need for greater health care services. New technology being introduced in the medical field may cut down on the time that doctors spend with patients, bringing about the need for an increasing number of medical technologists. Computer-based equipment such as the CAT scanner "will generate a burst of job growth for medical specialists that may even outstrip job creation in data processing," says Charles Bowman, head of the Economic Growth Division of the U.S. Bureau of Labor Statistics.

High Technology Occupations

As many as 50 new electronic companies are formed each month in this country, according to the American Electronics Association (AEA). The AEA gathered statistics to quantify what it believes is a growing shortage of workers for high technology industries.

The "Hot spots" of growth, and the number of workers needed are as follows: computer software engineers, 12,957; electronic engineer techonologists, 4,212; analyst programmers, 11,570; other computer professionals, 7,725; applications programmers, 2,612; jr. technicians/testers, 6,733; field service technicians,

402; drafters, 4,019; design drafters, 3,033; electronic engineers and computer science engineers, 55,301; electronic technicians, 18,693; assemblers, 66,421.

This first-time effort to conduct a national survey of employment projections results from a growing concern expressed in recent years by industry leaders regarding shortages of technical people and the impact of these deficiencies on the industry.

Among the survey's findings:

- The continued healthy state of the computer and computer-related part of the industry will generate a greater need for computer specialists.

- Heightened demand for laser technicians indicates that this slow developing part of the industry will begin to blossom more fully.

- The burgeoning semiconductor segment forecasts a large increase in the need for microelectronics technicians.

Overall the survey reflects the 671 responding companies' need for 113,098 professionals and 140,002 paraprofessionals nationwide by 1985. The surveyed firms represent $77.7 billion in annual sales.

Even after doubling in the 1970's, overall employment in the computer field is expected to almost double again by 1990, according to the U.S. Department of Labor. All job categories except keypunch operators will grow rapidly. Topping the list of fast-growing occupations is computer service technician with a projected growth rate of 154 percent between 1978 and 1990. Opportunities for systems analysts will grow by 120 percent.

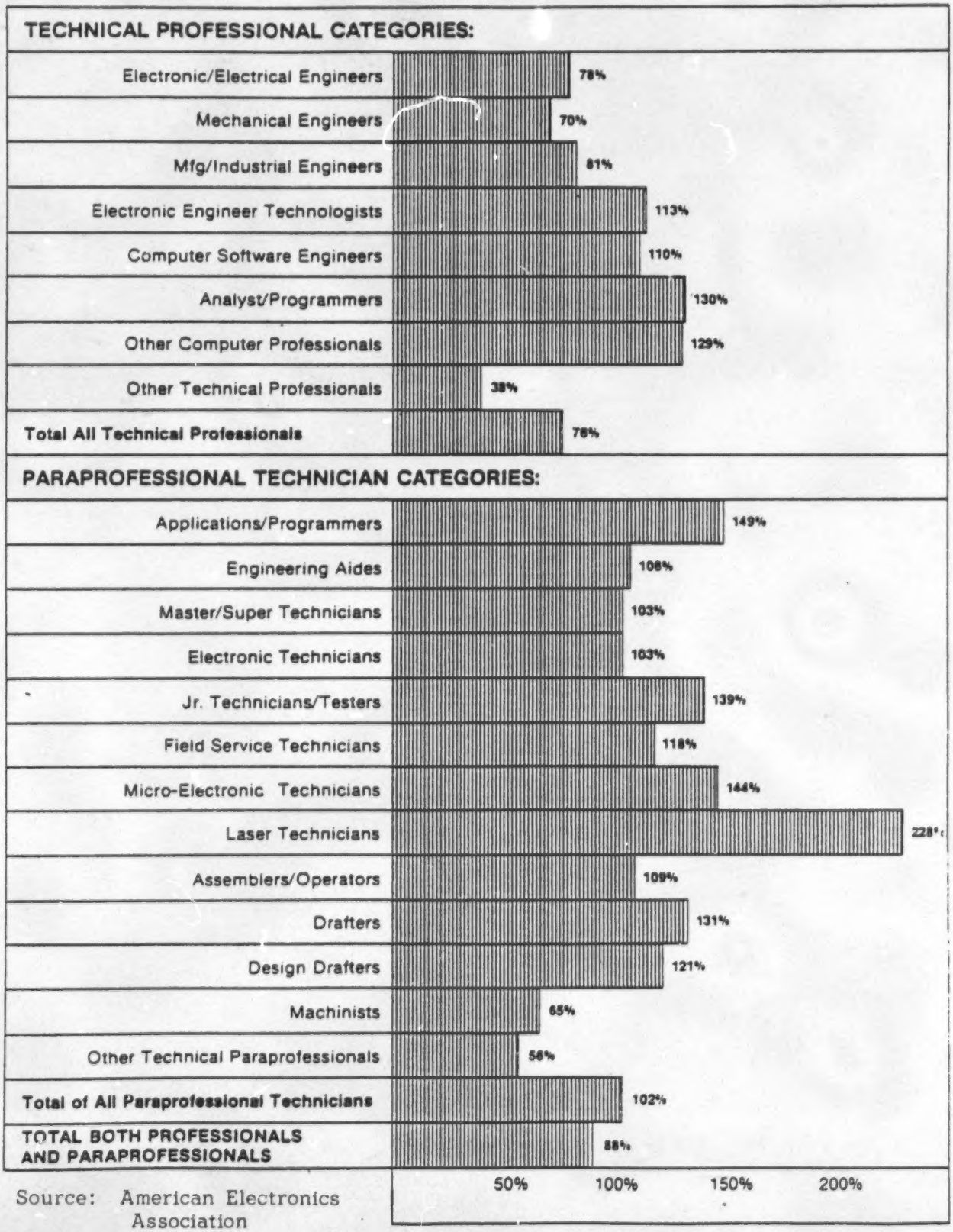
The largest occupational group in the computer field--computer and peripheral equipment operator--will more than double: job openings should average 46,200 a year.

Increasing use of computers will be the main stimulus to higher employment over the next decade, according to the U.S. Department of Labor. Although progress in hardware and software technology may temper the demand for computer workers at some computer sites, these same technological advances are expected to bring the computer within reach of an increasing number of users. The value of minicomputer shipments by U.S. manufacturers, for example, is expected to more than triple between 1978 and 1983--increasing from $3.1 billion to $10.3 billion.

Not only will competition among employers for skilled personnel intensify but this competition will have a significant impact on employment of workers in occupatons requiring similar aptitudes.

High schools, for example, are experiencing difficulty attracting and keeping mathematics teachers because these workers are lured away by higher salaries in computer work. Community colleges, vocational schools and universities are also finding it difficult to compete with business and government in retaining computer science professors who may earn less than a beginning programmer does in business.

UNITED STATES: AEA DATA ONLY
Projected Growth as Percentage of Total
1981-1985



Source: American Electronics Association

Machine Tool Industry

The machine tool industry builds the machines that are the foundation of the United States industrial and military strength. Few, if any, goods and services could exist without the industry. There would be no aircraft, ships, cars, railroads, appliances or agricultural machines.

There currently are about 2½ to 3 million American-made machine tools in more than 120,000 plants around the United States that must be operated and serviced by skilled machinists, machine operators, service engineers, maintenance personnel, set-up workers and supervisors.

According to the National Machine Tool Builders' Association, since 1964, American imports of machine tools have more than tripled from seven percent of total consumption 16 years ago to almost 30 percent this year. The U.S. share of the global market for machine tool production dropped from 35 percent in the mid-1960s to approximately 15 percent today.

Just to meet the current requirements, the U.S. Department of Labor says some 22,000 new machinists and nearly 9,000 tool and die makers will be needed in the U.S. through 1985. Yet the number of new journeymen for both trades combined totals only 5,000 per year, according to the Department of Labor's Bureau of Apprenticeship and Training. When one considers that the average age of tool and die makers is 47, it's clear that the demand will far exceed supply in the not too distant future.

A survey conducted last year by the National Tooling and Machining Association found that some 60,000 journeyman level workers would be needed by the job shop industry alone, and that 250,000 new journeyworkers would be needed over the next five years.

According to Steel, a publication of the metalworking industry, practically all tool and die shops report that the shortage of skilled workers is causing a tremendous loss of production and income. Many of the industry managers claim, according to the article, that "about 20 percent more business could be handled if competent workers were available."

Office Occupations

Office employment has increased steadily over the past 20 years, and that trend is expected to continue through 1990.

Nearly 3.6 million persons worked as secretaries in 1978, according to the U.S. Department of Labor, including 162,000 legal secretaries and 83,000 medical secretaries. Clerical jobs accounted for some 17 million workers in 1978.

The combination of feminism, the better education of today's worker and the changing technology of the office may account for what is becoming a growing shortage of secretaries and office workers. A national survey conducted by the Dunhill Personnel System reveals that currently there are shortages of about 80,000 secretaries and the deficit is expected to surpass the quarter million mark by 1985. The Labor Department estimates that currently 20 percent of all secretarial openings remain unfilled. There are more than 400,000 unfilled full-time permanent general clerk and clerk typist jobs available in this country, according

to the February, 1981 issue of Education Digest.

There are growing difficulties finding secretaries and word processing operators who have qualifications considered essential for employment, according to personnel officers.

"Approximately 130,000 new word processing machines are installed each year and that's 130,000 new jobs created. By 1984, that figure is expected to triple," says Milton Fromstein, president and chief executive officer of Manpower, Inc., the world's largest temporary help firm.

"We can't train enough people to work as secretaries, word processors and data-entry clerks," says Fromstein, whose firm has resorted to training temporary help to provide back-up assistance to office workers.

Wendy Weiler, marketing director for Mature Temps., a national temporary employment service, speaks of "more orders than we can handle for secretaries and word processing operators. There is definitely a dearth of office workers that can handle the new word processing technology."

Besides the technical skills needed to manage the new word processing technology, corporate officers describe problems finding office workers who have the basic language, spelling and grammatical skills needed to function in the contemporary office.

A word processing task force set up by the Chicago Private Industry Council diagnosed an acute shortage of word processing operators in the Cook County area. As corporate executives from Standard Oil, Sears, Montgomery Ward and Arthur Young and Co. described their needs, it became clear that basic language and grammar skills were among competencies that were most difficult to find among otherwise qualified applicants.

Maureen Kelly, manager of the National Personnel Agency in Washington, D.C., says that her organization is hard pressed to find secretaries who can take shorthand--a skill once considered a mainstay of the secretarial profession. (A recent survey indicated that 71 percent of the top managers and 52 percent of the middle-level managers dictate directly to a shorthand writing secretary.)

II. SOLVING THE SKILLS SHORTAGE

The basic objective of federal employment and training policy should be high employment. Much of the nation's well-being is tied to the achievement of that goal. When unemployment goes up, federal expenditures for welfare spiral while tax receipts decline. Social unrest, juvenile delinquency and crime rates also go up with the unemployment rate.

Federal involvement in employment and training began as an effort to assist the states in raising the productive capacity of individuals so that they might chart their own destinies in a capatalistic system. The Smith-Hughes Act of 1917, which established national support for vocational education programs, was a major federal effort to assist the states in preparing people for work. The purpose of the legislation was to provide a means of sustaining high employment.

After World War II, many people feared that a new wave of unemployment would accompany the return of the war-time army to civilian life. Congress passed the Employment Act of 1946, the George-Barden Act, and the G.I. Bill to address this concern. These measures helped avert a post-war depression. It is interesting to speculate about how much of the post-war boom can be attributed to the technical training and experience which the defense workers and the veterans had acquired hastily during the war and the education and training which so many pursued under the G.I. Bill upon returning to civilian life.

In 1962, however, Congress made a major change in its approach to employment and training needs with the passage of the Manpower Development and Training Act. The act established what was clearly a federal program, with the states and local communities contributing nothing in the way of resources. Because unemployment for minority groups had become a serious problem, the Administration, with the tacit approval of Congress, decided to make another major policy change. The MDTA programs were focused on the hard-to-train.

The next year, the Vocational Education Act of 1963 expanded federal support of vocational education in an effort to assure accessibility to quality vocational programs for youth and adults in all communities.

The difference in the two approaches was dramatic. The MDTA legislation was a direct effort to improve opportunities for one segment of the population. It was the forerunner of the Comprehensive Employment and Training Act of 1973. The focus moved increasingly away from training toward a heavy dependence on public service employment. In essence, CETA became an income transfer program.

It was sold on the basis of giving the decision-making authority to governors, mayors and county officials, who in fact took on additional duties as welfare managers, administering programs funded totally by the federal government. The emphasis was on maintaining rather than developing the individual and on public employment to serve short-term needs rather than on preparing people for permanent employment in the private sector.

The other approach, manifest in the Vocational Education Act, was to build a permanent system funded primarily with state and local dollars. Federal dollars served as the catalyst for creating new programs which were then maintained and expanded with local funds. The emphasis in this program was on providing preparation for work for all people for both entry-level and more advanced employment.

This act helped foster an increase in enrollments in vocational programs from 4.2 million in 1963 to 17.2 million by 1979, with over 7 million in occupational specific programs. Community college, skill center, technical institute, area vocational school and high school programs were expanded. The institutional capacity of vocational education more than doubled during this period.

But subsequent amendments to the Vocational Education Act moved away from the goal of improving productivity efficiency and accessibility for all toward an emphasis on equity for disadvantaged populations. Federal funds were directed almost totally to that goal, leaving support of the basic system increasingly to states and local communities.

Federal policies moved increasingly away from efforts that would develop the capacity of individuals to fill the broad range of middle and advanced level technical skilled jobs so critical to our national well-being.

Yet during this period, most of the new jobs were jobs requiring more education and occupational skills. Between 1959 and 1978, total employment increased by 30 million workers. More than half the increase -- 16 million new jobs -- was in the higher level professional, technical, managerial-administrative, sales and crafts occupations. The job market of the country shifted heavily toward services. In 1948 there were 20.9 million people in goods production and 27.3 million in services. In 1977, there were 25.1 million in people in goods production, but the number in services had multiplied to 54.4 million.

The shift in focus of federal efforts to assist in education has created several problems that have served to intensify the skilled worker shortages.

The basic objective of high employment cannot be met if national employment and training programs focus, as they have over the past decade, on maintaining rather then developing people. Approximately three-fourths of the modest growth in output per worker during the five-year period between 1973 and 1978 can be attributed to education and training, as shown on the chart below. It accounted for a much larger share than increases in capital per worker.

SOURCE OF GROWTH IN OUTPUT PER UNIT OF LABOR

	1948-1966	1966-1973	1973-1978
Total Annual Percentage Change	3.5	2.1	1.1
Increases in Capital per Worker	0.7	0.5	0.3
Education and Training	0.6	0.7	0.8
Net Influence of Other Factors	2.2	0.9	0.0

Source: John W. Kendrick, The American Enterprise Institute Economist, November 1980, p. 3.

The extent of the impact that education and training has on productivity is argued by economists, but virtually all growth models suggest that as we move to revitalize our economy, improving human efficiency will become increasingly as important as the efficiency of plants and technology.

In a recent paper prepared for the National Council on Employment Policy, economist Isabel Sawhill of the Urban Institute offers the military as a prime example of the problems which may occur when capital equipment becomes more sophisticated than the available labor force. She suggests that in this case "buying more hardware does not look like a very good investment unless accompanied by a major effort to upgrade the skills of those who will have to use it."

She recommends that as the Administration makes plans to double its spending for defense, it might consider making this sector a laboratory for the development of new education and training systems with possible "spill-overs for the civilian sector."

The critical mismatch between workplace needs and workers' skills would not exist to the extent that it does today if government policies over the past decade had placed some emphasis on hard-to-fill jobs rather than focusing all efforts on the hard-to-train.

Our current welfare structure is not the foundation on which the entire employment and training efforts of our nation should rest. Rather we must relate our employment and training programs to the occupational structure. One major concern of this program would be to serve the hard-to-train, but focus would also be placed on moving individuals into advanced-level skilled and technical jobs.

Such a training system would be managed by educators from the public and private sectors. Managers of the welfare system would work with the poor and hard-to-train in securing the services that would allow these individuals to move into the mainstream system. Rewards within the system would be based on successful completion of the program.

Achieving Long-Term Solutions

A major difficulty with current policies is that they are focused primarily on short-term approaches directed more toward symptoms than causes. Under our present policy, communities are in effect rewarded for high levels of youth and adult unemployment. That is, the higher their unemployment levels, the more dollars communities receive.

Too often our federal efforts have focused more on establishing alternative short-term and ad-hoc systems rather than on helping our permanent institutions to grow and improve to meet the needs of our entire population. Improving the permanent system offers the best chance to arrive at long-term solutions that address the root rather than the symptoms of the unemployment problem.

With dollars directed toward quick solutions, the long-term solutions to youth unemployment, structurally unemployed adults and the loss of jobs have continued to elude us. Our efforts must in the future focus on building the capacity of each state and each community to prepare all of its citizens for permanent jobs in the

private sector.

Such assistance would aid communities that do not have adequate vocational training programs to expand them. The result would be an increased capacity to attract and hold jobs in the community because employers can be assured that there are employers available who have the necessary skills to meet their needs.

Contrast this approach with the efforts of the immediate past in which we have paid students who left existing secondary school programs for short-term public service jobs which did little to equip them with the needed skills for private sector employment.

In a review of CETA training conducted in 1980, former administrator of the office of youth programs, Robert Taggart, presented findings that show without question that longer-duration training pays off. The earnings for CETA trainees who took part in a training program for more than 40 weeks were nearly six times those of participants who had only 11-20 weeks of training. By far, long-term vocational training has been the most seccessful effort under CETA to raise the earning power of persons in the private sector.

While recommending a number of changes in current CETA approaches, Taggart particularly emphasized the need for more intensive training "so that individuals with initial deficits but substantial potential can move upward."

He concluded his statement by saying:

> "Those who preach the supply-side Gospel, as well as those concerned with mitigating the inequities which have proved resistant to short-duration interventions, should be able to find common ground in support of more intensive training investments for persons of limited employability."

Building the Capacity to Prepare Skilled Workers In Depressed Communities

There is a significant and growing need to attack the conditions that cause most of our large cities and many of our rural areas to be economically depressed. Aging industrial plants that are no longer competitive, large numbers of structurally unemployed workers, high levels of unemployed youth--especially minority youth--and the flight of businesses to more attractive settings have caused major problems for our older cities. Many rural communities face problems as well, having lost much of their economic base as a result of changing technology in agriculture, which requires fewer workers, larger farms and more sophisticated equipment.

Communities that demonstrate they they can provide employers with competent workers will strengthen their hold on existing jobs and attract new jobs. Small companies which provide the bulk of new jobs in America do not have the capacity to do in-house training. They depend upon the public institutions that their tax dollars support to provide skilled workers.

Today's inner city and economically depressed rural communities cannot reduce the flow of the unskilled into the labor market without adequate educational programs. Industry will not consider such communities good places for expansion until they can upgrade and update their existing workforce and until they have

the capacity to increase the number of youth who enter the labor market with a broad array of skills--literacy, work orientation, interpersonal, employability and technical know-how.

The facts show that America's economically depressed communities are those with the least capacity to provide occupational and employment-related education to all who need and want it. Yet many federal programs encourage such communities to capture more federal dollars for transitory goals, rather than make the kind of investment that would help strengthen their capacity to mount prevention and rescue programs to develop their citizens.

Recent data show that those communities with the greatest need have the least capacity to provide employment-related education and training. The tables on the following pages show that central cities with a metropolitan population over 500,000 have only 10.6 percent of secondary training stations and 13.3 percent of postsecondary training stations, but 22.8 percent of the population. Towns or regions under 25,000, while adequately served by secondary programs, have only 6.7 percent of the postsecondary training stations but 23.6 percent of the population.

Further, vocational education faces major problems in keeping its basic program current during this decade. It must keep its staff, curricula and equipment up-to-date with present and projected technological changes.

Meanwhile, inflation has been consistently reducing the amount of services, materials and equipment which can be purchased with available budgets. The cost of energy, instructional materials, teachers' salaries and equipment have increased dramatically during the past decade. Most school budgets have not increased as rapidly. In fact, over the past decade the federal investment in the nation's programs of vocational education has dropped more than 50 percent. (See accompanying chart.)

In many instances these increased financial burdens have prevented local agencies from developing and expanding programs for target groups. However, it has also meant that there has been little, if any, money to replace equipment and improve the basic program. Because staff salaries have fallen significantly below those in business and industry, each year there is a flow of vocational teachers out of the classroom and back into private employment. With all of these constraining influences and the fact that vocational education costs more than other types of education, there has been a noticeable trend for local schools to either reduce the quality of their vocational programs or cease to offer them.

Federal policies should direct funds to aid economically depressed communities by developing and sustaining the capacity of such communities to prepare those in need of vocational education in mainstream institutions which can ready them for unsubsidized private sector employment. While economically disadvantaged individuals will need financial support while pursuing job-specific training, this kind of support should not be so great that it becomes a disincentive to pursuing unsubsidized employment.

Table 1

Distribution of Institutions and
Instructional Stations in Secondary Schools Population

Population Region Type	Institutions Number	Institutions (Percent)	Instructional Stations (Percent)	Population (Percent)
Central City, Metropolitan Population over 500,000	453	8.1	10.6	22.8
Suburb, Metropolitan Population over 500,000	597	10.7	13.5	38.0
Central City, Metropolitan Population 100-500,000	368	6.6	8.2	8.9
Suburb, Metropolitan Population 100-500,000	277	5.0	6.1	3.6
City or Town Population 25-100,000	958	17.3	21.4	3.1
Town or Region Population 0-25,000	2,402	43.2	34.5	23.6
Service Area not Elsewhere Classified	505	9.1	5.7	NA
Total	5,560	100.0	100.0	100.0

Source: National Study of Vocational Education Systems and Facilities, Vol. 1, Technical Report, WESTAT, Inc., October, 1978.

Table 2

Distribution of Institutions and
Instructional Stations in Postsecondary Schools Population

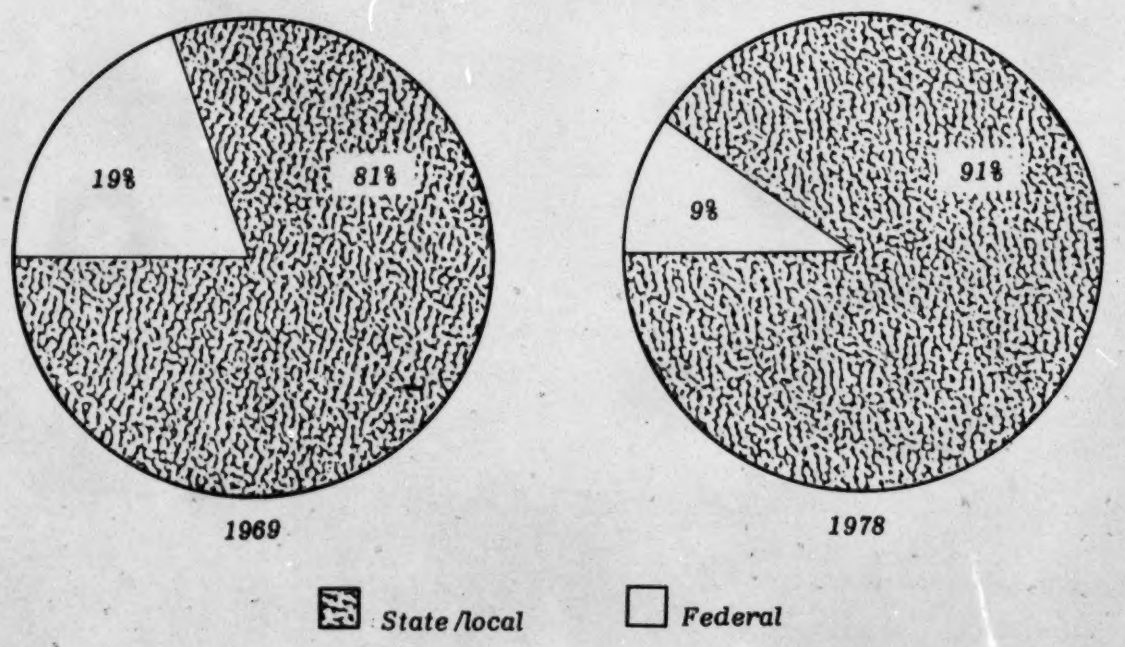
Population Region Type	Institutions Number	Institutions (Percent)	Instructional Stations (Percent)	Population (Percent)
Central City, Metropolitan Population over 500,000	103	9.3	13.3	22.8
Suburb, Metropolitan Population over 500,000	110	10.0	10.5	38.0
Central City, Metropolitan Population, 100-500,000	102	9.3	17.1	8.9
Suburb, Metropolitan Population 100-500,000	33	3.1	2.9	3.6
City or Town Population 25-100,000	197	17.8	15.5	3.1
Town or Region Population 0-25,000	115	10.5	6.7	23.6
Service Area not Elsewhere Classified	440	40.0	34.0	NA
Total	1,100	100.0	100.0	100.0

Source: National Study of Vocational Education Systems and Facilities, Vol. 1, Technical Report, WESTAT, Inc., October 1978.

Matching Federal Expectations and Federal Appropriations

In recent years, federal appropriations have covered a declining proportion of the costs of vocational education, while federal mandates have determined a rising proportion of program requirements. The federal share decreased from 19 percent of total expenditures in 1969 to 9 percent in 1978. Federal funding has not kept pace with inflation or with rapidly increasing student enrollments.

Federal/State Share of Total
Vocational Education Expenditures



Since 1972, the purchasing power of the federal investment in vocational education, in constant 1967 dollars, has decreased by $55 million. Between 1972 and 1978, the federal per-student expenditure declined in constant dollars from $32 to $15. During this period, enrollments grew from 11.6 million to 16.7 million, but federal share of support dropped by more than 50 percent.

III. WHY VOCATIONAL EDUCATION?

Why should vocational education be particularly concerned about the shortages of skilled workers? The problem is of special importance to vocational educators because it is within the occupations for which they train workers that shortages are the most pronounced.

In recent data, jobs requiring vocational education training topped the list of occupations the Department of Labor says employers most commonly seek to fill. A recent issue of Occupations in Demand gives details on jobs most frequently listed by employers at 2,500 Job Service offices throughout the country during the January through March period of 1980.

All of the high-demand occupations for which education beyond high school would be needed require vocational training. In rank order they are: accountant, practical nurse, general duty nurse and electronics technician. "Hard-to-fill" occupations with vocational education prerequisites include auditing, electronic and electrical production, installation and repair and medical support work.

The U.S. Department of Labor estimates that there will be an average of 5.5 million job openings annually through 1990. As Table 2 shows, nearly 20 million jobs will be new and the remaining openings will be replacements. Some shifts in vocational education enrollment patterns will be required to assure that program completors will be trained in areas of demand. Often change is slow because it is cheaper to continue out-of-date programs than to close them and open new ones; new vocational programs require new capital investment. Yet it is in the nation's interest to have workers prepared in fields where there are opportunities for employment.

Another reason for vocational education's concern about the skilled worker shortage is the fact that programs are designed to be responsive to local needs. For instance, when skilled worker shortages became a problem in Cleveland, Ohio, local manufacturers consulted the local vocational educators. The manufacturers developed a film and materials to encourage students to enroll in vocational education to learn machinist trades. During the last two summers, special training programs were set up for adults and out-of-school youth. In one year, enrollment in machinist trade programs increased from 260 to 360 students.

Vocational education programs can be responsive to local needs because they are decentralized. The selection of programs is determined by the community, not by the federal government. It is understood that local communities can define their needs better than federal planners, so they function in a partnership with the state and federal government. This shared approach facilitates unique solutions to problems that differ widely from community to community.

Let us now take a look at some programs that are already helping to solve the skilled worker shortage in communities around the country.

Customized Training

Vocational education programs are working closely with industry to help correct the mismatch between the needs of the workplace and the skills of workers. Industries across the country are turning to vocational education to help relieve their worker shortages. By providing customized training, vocational educators can tailor their programs to the needs of a given industry.

Table 7

Projected Change in Employment by Major Occupational Group, 1978-90
(in thousands)

Occupational Group	Employment			Openings		
	1978	Projected 1990	Percent Change[1]	Total	Growth	Replacements[2]
White-collar workers	47,205	58,400	23.6	36,800	11,200	25,600
Professional and technical workers	14,245	16,900	18.3	8,300	2,600	5,700
Managers and administrators, except farm	10,105	12,200	20.8	7,100	2,100	5,000
Sales workers	5,951	7,600	27.7	4,800	1,700	3,100
Clerical workers	16,904	21,700	28.4	16,600	4,800	11,800
Blue collar workers	31,531	36,600	16.1	16,200	5,100	11,100
Craft workers	12,386	14,900	20.0	7,000	2,500	4,500
Operatives except transport	10,875	12,500	15.0	5,600	1,600	4,000
Transport operatives	3,541	4,100	16.2	1,700	600	100
Nonfarm laborers	4,729	5,100	8.1	2,000	400	600
Service workers	12,839	16,700	29.9	12,200	3,800	8,400
Private household workers	1,162	900	-23.2	500	-300	800
Other service workers	11,677	15,800	35.2	11,700	4,100	7,600
Farm workers	2,798	2,400	-15.9	1,300	-400	1,700
Total.....	94,373	114,000	20.8	66,400	19,600	46,800

[1]Calculated from unrounded figures
[2]Due to deaths, retirements, and other separations from the labor force. Does not include transfers out of occupations

Source: Occupational Outlook Quarterly, Spring, 1980

Table 3

FASTEST GROWING SKILLED JOBS
1978-80

Occupation	Annual Openings
*Bank Clerks	45,000
Bank Officers and Financial Managers	28,000
*Business Machine Repairers	4,200
City Managers	350
*Computer Service Technicians	5,400
*Construction Inspectors	2,200
*Dental Assistants	11,000
*Dental Hygienists	6,000
Health Service Administrators	18,000
*Homemaker-home Health Aides	36,000
*Industrial Machinery Repairers	58,000
*Landscape Architects	1,100
*Licensed Practical Nurses	60,000
*Lithographers	2,300
*Nursing Aides, Orderlies, and Attendants	94,000
Occupational Therapists	2,500
*Occupational Therapist Assistants	1,100
Physical Therapists	2,700
Podiatrists	600
*Respiratory Therapy Workers	5,000
Speech Pathologists and Audiologists	3,900
*Travel Agents	1,900

NOTE: For these occupations, employment in 1990 is projected to be at least 50 percent higher than it was in 1978.

Table 4

SKILLED JOBS WITH THE MOST OPENINGS, 1978-90

Occupation	Annual Openings
*Secretaries and stenographers	305,000
*Retail sales workers	226,000
*Building Custodians	180,000
*Cashiers	119,000
*Bookkeeping Workers	96,000
*Nursing Aides, Orderlies, and Attendants	94,000
*Cooks and Chefs	86,000
Kindergarten and elementary teachers	86,000
*Registered Nurses	85,000
*Assemblers	77,000
*Blue-collar Worker/ Supervisors	69,000
*Local Truck Drivers	64,000
*Accountants	61,000
*Licensed Practical Nurses	60,000
*Typists	59,000
*Carpenters	58,000
*Industrial Machinery Repairers	58,000
Real Estate Agents and Brokers	50,000
*Construction Laborers	49,000
Engineers	46,500
*Bank Clerks	45,000
Private Household Workers	45,000
*Wholesale Trade Sales Workers	40,000

NOTE: Replacement needs and growth are projected to cause these occupations to offer the largest number of openings. Competition for openings will vary by occupation.

*Starred items indicate fields in which vocational education is available.

SOURCE: Occupational Outlook Quarterly, Spring, 1980.

Vocational educators can work with industry in a variety of ways. Training programs can be set up in vocational facilities to prepare an industry's workforce or the program may actually be conducted in the plant or firm itself.

In a number of states, the state department of vocational education has taken a leadership role in attracting new industries to the state by channeling the resources of local vocational education programs. In conjunction with economic development agencies, the state department of vocational education will work with industries considering expansion or relocation to ensure that a well-trained workforce will be available to meet their needs.

One of the best examples of a statewide response to the needs of industry is offered by the Department of Vocational and Technical Education (Vo-Tech) in Oklahoma. Since 1968, Vo-Tech has developed a network of industrial coordinators whose main job is to collaborate with business in their areas in order to assess and meet their training needs. Regular contacts between industry and the area vocational technical schools have improved the overall quality of vocational education in Oklahoma and at the same time have built a climate that industry considers good for business.

Along with the industry liaison program, Vo-Tech works closely with the economic development department to ensure quality and timely training support to new industries and businesses. Through a special school program, Vo-Tech contracts and delivers training services to new industries at a time when they are most in need--at the start-up time.

Essentially, the assistance for Vo-Tech amounts to a guarantee to a new industry that when they are ready for production, trained workers will be ready to tend the machines and equipment. Needless to say, this service is appreciated by industry, which has rewarded Oklahoma by locating more than 300 plants in the state since 1968, creating thousands of industrial jobs and millions of dollars in tax revenue for the local and state governments.

It has solved the state's need for skilled workers and created a confidence that is reflected in a growing population, low unemployment and a strong vital economy.

In addition to channeling the resources of local vocational centers, state vocational departments often provide leadership in the development of curriculum. Typically, the state vocational education department will collaborate with a local university to develop the instructional materials needed to train a firm's workforce.

In Michigan, for instance, the Calhoun Area Vocational Center has provided assistance to a host of new industries in the development of curriculum. Those firms assisted include: Keiper, U.S.A.: T.S.K. of America, Inc.; Stouffer Hotel, Inc. and Kellog, Inc.

One of the incentives used to bring the Wacker Siltronics Company of Germany to the Portland, Washington area was the ability of Portland Community College to train large numbers of people. Obtaining funds to prepare workers was critical in Wacker's decision to locate in Portland. It took approximately $730,000 to finance instruction, curriculum development and the payment of stipends to the CETA clients who were trained. A combination of federal vocational education, CETA, city of Portland and private funds were put together to support the devel-

opment of this program.

Wacker also loaned $2,000,000 worth of equipment to Portland Community College and reimbursed expenses of 12 instructors who were sent to Germany for six weeks of training in the Wacker process. The college used its own funds to remodel a building for training purposes.

The program was started in August, 1979 and completed in July, 1980. Some 740 disadvantaged students (CETA-eligible clients) entered the program. Approximately 470 previously unemployed Portland residents, after completing the vocational program, were hired by Wacker at $6.00 and $6.25 per hour. This training brought a $5,875,000 payroll into Oregon and took 470 people off the unemployment rolls. The long-term positive effect is immeasurable and a striking example of what industry and vocational education can do to provide the skilled workers needed for business growth and expansion.

The value of vocational education is so apparent to the Weyerhaeuser Corporation that it is planning to provide Columbus, Mississippi with a fully equipped learning center. The $750 million facility will be used to help Weyerhaeuser train some 850 local residents during construction and start up of the corporation's pulp and paper complex.

Development of the 12,000 square-foot facility is a joint effort of the Golden Traingle Voc-Tech Center and the Weyerhaeuser Company. The vocational center is providing some funding for instructors, educational materials and classroom shop teaching equipment. The center is currently being used to teach students basic construction techniques, such as welding, blueprint reading and carpentry.

In the future it will be used to train Weyerhaeuser employees in the skills required to start up and manage operation of the woodyard. Professional and career development activities, such as instruction in supervisory, leadership and communication skills, will also be taught. And a basic educational program will be offered to teach local residents the math, reading and comprehension skills needed to work for Weyerhaeuser.

Escanaba, Mich. has begun to solve its skilled worker shortage by making instructors out of local businesspeople. Through the program, which resembles cooperative education, a local business or industry provides 12 hours of instruction per week to the student during the training period. At the same time, each student enrolls for a minimum of eight credit hours of related instruction at the local Bay de Noc Community College.

In most cases the process results in a job for the trainee and a trained employee for the participating employer. Placement rates for those completing the program range from 80 to 90 percent.

Retraining Adults

A comprehensive vocational program should provide incentives that will encourage workers to acquire new, higher-level skills. These incentives could be used most effectively to encourage workers to acquire skills which would enable them to work in those high-technology and skill areas that are most critical to our nation's well being and in those occupational areas where the greatest expansion is expected in the future. These efforts will help to reduce the number of workers who are displaced or structurally unemployed because they only have skills for

jobs which are no longer in demand.

According to testimony presented before the Senate Labor and Human Resources Committee, as many as 2.5 million Americans may suffer from the effects of "economic dislocation" each year, facing unemployment and the need for retraining. Workers from a variety of industries are affected by the structural change that can result from foreign competition, shifting energy sources automation and changing market demand.

A recent article in Business Week projects that some 45 million existing jobs--45 percent of all jobs--could be affected by office and factory automation.

Displaced workers, in many cases, are learning new skills at vocational schools, skills centers and community colleges. Funding for a number of retraining efforts has been provided under Title II of the Comprehensive Employment and Training Act (CETA) and Trade Adjustment Assistance (TRA) under the Trade Act of 1974.

A case in point is the Lake County CETA program in Waukegan, Illinois. The program administered a one-year retraining course for 60 former steel industry workers at a local vocational school and community college. Participants received an associate's degree, a one-year college certificate or a vocational certificate upon completion of their respective programs.

The program began when the United States Steel Corporation shut down its steel mill in Waukegan. The steel company had been laying off workers gradually for approximately two years, but layoffs increased sharply in October, 1980 when the last employees--senior craftspeople and skilled office workers with 18-30 years experience--were let go.

In total, approximately 550 people were laid off. CETA administrators determined that the laid-off workers would be eligible for $259 each week in unemployment insurance (UI) benefits, an amount equalling 70 percent of their average weekly manufacturing wage. TRA funds were used when the UI benefits were exhausted after six months.

Approximately 400 laid-off workers were contacted by the Illinois State Job Services Division where they met with counselors to discuss their previous experience. CETA personnel assessed their aptitude in various job skills and the laid-off workers made their decisions on which training programs to enter.

Fifty-one workers attended courses at the Lake County Area Vocational Center; nine attended the College of Lake County, the local community college. Trainees at both schools studied skills for which there is a proven need, ranging from air conditioning, refrigeration and heating to small engine repair. Ordinarily the school houses 1,200 high school students, who attend a two-year program. The adult participants, on the other hand, were encouraged to learn at their own pace and were able to complete the courses in one year or less.

Before the year was up more than 50 percent of the trainees were placed in jobs in a new career field.

A similar story resulted when plant closings in Youngstown, Ohio sent 20,000 workers looking for new jobs. The Choffin Career Center opened its doors to some 2,600 adults in need of retraining. Vocational training programs were rede-

signed to meet the needs of the new clients. Curricula were repackaged to take into account the adult's previous experience, with advanced courses offered to those students having a knowledge of the basics of a field. Welders, for instance, were placed into accelerated programs, tested, and relocated with General Dynamics Corporation in Connecticut or shipyards in Mississippi.

Orange County and Binghamtom Community Colleges in New York make an effort to alert laid-off workers in their areas to educational opportunities at their schools. The colleges' activities include assigning staff to assist workers, making contacts with company and union officials, organizing an area job fair and writing to workers about college programs. At the completion of the college programs, more than 50 percent of the displaced workers had found new jobs.

Apprenticeship Training

One important form of entry into the skilled trades is through apprenticeship training. Vocational education may be used to prepare persons for apprenticeship careers in a number of ways. It is not uncommon for apprenticeship sponsors to give applicants additional bonus points for taking training at a vocational school. It is also possible in some areas of the country for vocational education program completers to receive credit toward completion of their apprenticeship.

For example, in Portland, Oregon, students completing a series of carpentry courses are given anywhere from three months to one year toward completion of their apprenticeship. Training to upgrade a worker's skills is also provided at the local vocational center for journeymen who are terminated from jobs for lack of skill.

Vocational educators are also working with apprenticeship sponsors to provide related instruction during an apprenticeship program. Even when private industry facilities are used, part of the instructor's salary is often funded by vocational education monies from state, federal and local sources.

In Fanwood, New Jersey, the Livingston-Wilbur Corporation is typical of many of the country's small machine shops, employing 45 workers. When shortages of machinists began to be a problem for the firm, it launched a major recruitment drive, using radio and newspaper advertising to attract new workers. According to corporation president, Gary Wilbur, those efforts were "a three thousand dollar exercise in futility."

Wilbur began to consider employing cooperative education students, as he recounted in testimony before the House Subcommittee on Elementary, Secondary and Vocational Education:

> "Our cooperative education students had some background in safety, had been exposed to machine tools and had a genuine interest in learning. But now we had to let them down!...In the early and mid 1970s our cooperative education students ceased classroom learning when they graduated from high school. We had no one to teach them, no classroom for them and had we the teacher and the room we couldn't have funded such a program. It seemed another blind alley for ourselves and I would venture to say for many thousands of small companies like ours...

The solution to the problem for Wilbur turned out to be a joint apprenticeship program between his firm and the area vocational center. Following graduation

from high school, cooperative education students enter the machinist firm for on-the-job training. Related instruction in shop, math, blueprint reading, grinding, heat treatment and metallurgy is provided through the county vocational schools. Partial support of students in the first year or two of instruction is provided by the Targeted Jobs Tax Credit.

Consequences of an Inadequate Development Strategy

It is clear that shortages of skilled workers hinder efforts to carry out the nation's defense, economic and energy initiatives.

Unless this problem is addressed, even more rampant inflation can be expected as defense-related industries compete with domestic industries for the small pool of skilled workers now available. As a result, the price of producing products will continue to rise and they will be further priced out of competition in the international marketplace.

We will witness a slow down in the growth of new plants and the adoption of advanced technology because there will be no workers to fuel this growth. A recent survey by the Massachusetts High Technology Council--the trade organization for the state's 100-plus technology-based firms--indicated that these businesses should create 100,000 new jobs over the next several years. According to Dr. James M. Howell, senior vice president for the First National Bank of Boston, "The majority of these jobs could be created in Massachusetts, or at least New England, but critical shortages of technical-skilled production workers now prevent this from taking place in as orderly a pace as regional policymakers desire."

The all-volunteer army will find it even more difficult to attract recruits who have the technical literacy skills needed to utilize and maintain sophisticated military equipment.

And, perhaps most disturbing of all, the structurally unemployed will remain unemployed because, without a major investment in retraining, they are not likely to acquire the skills that the expanding military-industrial base will require.

IV. TOWARD A NATIONAL EMPLOYMENT AND TRAINING POLICY

"The Japanese, West Germans, French, and most nations in Western Europe have embraced, not merely accepted, the philosophy of the necessity to invest in human resources. To build and maintain an up-to-date labor force is essential for a technology-oriented nation," said Dr. Herbert Striner, dean of the Kogod College of Business Administration of American University in Washington, D.C. in a recent paper prepared for the National Center for Research in Vocational Education at Ohio State University.

The successes of these nations over the last three decades in increasing productivity, lowering unemployment and keeping inflation at a manageable level, should, he notes, offer valuable, applicable examples for us to follow. The solutions must not be more of the same band-aid type programs, he warns.

Developing the skills of the American people remains one of the greatest challenges facing our nation. A $1.4 trillion investment in sophisticated machinery and weapons will not solve the defense needs of our nation if we do not have trained people to build, operate, and maintain this equipment. Right now, as demonstrated in this report, we do not have these people. We also lack a policy that will enable us to develop the skills of our citizens to fill these roles.

Government and industry planners must accept that there is no quick solution to the skilled worker shortages that have been growing over the past decade. The solution must involve a comprehensive, long-term, intensive effort. Programs must be designed to serve workers at all levels of employment in meeting specific educational needs required for advancement.

The development of skilled manpower deserves planning and nurturing, especially when one considers the complex mix of skills, values and work habits which are needed for today's technological society. Vocational education can contribute significantly to this nation's efforts to enhance economic and military preparedness given the necessary legislative support. We believe that implementation of the following recommendations by Congress will allow vocational education to make the fullest possible contribution to resolving the skilled worker shortage.

1. Staying Current

The reauthorized vocational education legislation to be adopted by Congress within the next year needs to reflect a new view of vocational education as an activity that is critical to efforts toward military preparedness and economic recovery. In The Future of Vocational Education, (Swanson, 1981), Robert Beck warns of the dangers of viewing vocational education merely as "an act of charity." Certainly the process of preparing one to make a living is too essential a concern to be reduced to a charitable function.

A major priority of basic state grants for vocational education should be to keep vocational education programs current with changing requirements of the work setting and the growth of high technology industries. Efforts must also be focused on raising the scientific and technological literacy of all vocational students. Particular emphasis should be given to those new worker competencies required as a result of industry revitalization, new inventions and technology and new approaches to energy conservation and generation.

2. An Adult Employment and Training Service

In its recommendations concerning reauthorization of the Vocational Education Act, the American Vocational Association is calling for a legislative provision establishing a new Adult Employment Training Service. Through this service, vocational education would give priority emphasis to the needs of displaced workers, other unemployed adults, workers in industries experiencing revitalization or technological change and workers in defense-related industries.

This service could provide short-term upgrading, updating and retraining to adults and customized training for new and expanding industries, for hard-to-fill community jobs and for established employers who need assistance in helping their workers cope with changing technology and work requirements.

Such a service can help the labor force be more productive and can serve to strengthen linkages with the private sector and with other public and private training systems.

The new title should mandate the addition of a new section in state vocational education plans entitled "Adult Employment Training Plan." This plan should be reviewed by local and regional economic development agencies designated by the state economic development department.

The state board of vocational education should have sole administrative authority for this title and should receive all funds allocated under the title for administration.

Activities which could be supported by funds under this title should include, but not be limited to, the following:

- Curriculum development in cooperation with private sector employers;
- Skills training and retraining in cooperation with CETA;
- On-the-job training in cooperation with CETA and private sector employers;
- Specific labor market research in cooperation with state employment services;
- Training and retraining, including in-plant seminars to improve productivity in cooperation with private sector and economic development agencies;
- Energy instruction, services and seminars in cooperation with the private sector and economic development agencies;
- Customized training for new and expanding industries;
- In-plant training tailored to the need of an industry or a group of small industries with common needs

3. An Emergency Defense and Economic Revitalization Training Program

The current Defense Production Act is intended to deal with dangerous shortages. There is growing evidence that a shortage of skilled workers will slow down our efforts to achieve the national goal of military preparedness and economic revitalization.

The program we are proposing could achieve the same dramatic results that the National Emergency Production Act achieved during World War II. As part of that program, more than $300 million in federal funds was made available to the state

boards of education to train workers for defense-related industries. By using an existing, tested structure, nearly 7.5 million persons were trained and put to work in communities all over the country to meet pressing military preparedness needs.

We feel that now is the time to carry out some important contingency planning for preparedness. Amending the existing legislation to include skills training and utilizing the knowledge and experience of the vocational education enterprise in this effort is one effective way to build our military capacity. It could also help to alleviate competition between domestic and defense-related industries for workers.

Defense-related industrial training programs will be much more cost effective and efficient if planned and implemented through the system of vocational education already in place. When the existing capacity and delivery system is used, the need for a new system in each plant in each industry is eliminated. If incorporated into the present national, state and local vocational systems, there would be a minimal need for additional administrative personnel. Valuable resources will be saved when duplication is avoided and overlap eliminated.

We feel that as part of this new program, funds should be authorized to provide customized training for new and expanding industries involved in economic revitalization and defense. This approach to building and upgrading our industrial capacity is already underway to some extent in all 50 states. At least 15 states have extensive and highly sophisticated customized training programs.

We suggest an authorization of $250 million for customized training. The program could be a shared federal and state effort, with the states increasing their participation over a five-year period. All funding would come from the federal government during the first year. In subsequent years, the state share would go up by 20 percent increments, achieving a one to one match in the sixth year.

We believe that strengthening the capacity of state boards of education to provide customized training to help meet the needs of employers for domestic or defense industries is one immediate way to address, in the short run, the current skilled worker shortage.

One reason that this program was so successful was that it had already actually started during peacetime. P.L. 668, enacted in 1940, had provided an initial authorization of $15 million for:

* Training programs which were responsive to the needs of industry

* Pre-employment training for beginning workers

* Supplementary training for those already on the job

* Flexible training as to location, length and content

By way of reminder, this was the period when we built Liberty and Victory ships by the hundreds, when industrial production of ships and planes underwent massive changes and when shortages of skilled male workers stimulated widespread use of women workers who also had to acquire skills quickly.

Details of this successful training experience was provided in the following two publications:

Vocational Training of War Production Workers, Bulletin 1946, No. 10 Federal Security Agency, U.S. Office of Education, GPO, 1946.

History of Industrial Education, by Melvin L. Barlow (Peoria: Charles A. Bennett Co., 1967), p. 316 ff.

The Defense Production Act permits "financial assistance for expansion of productive capacity and supply...to facilitate the production of goods and services necessary for the national security and other purposes."

Surely building the productive capacity of people is an appropriate purpose for assistance because skilled workers are an integral part of an overall approach to revitalization.

Such legislation could help to fill certain categories of skilled jobs by upgrading existing workers to perform the higher level of skills or to train the unemployed with the necessary prerequisite experience and skills.

4. A National Human Resources Board.

This board could determine what shortages exist, which are critical and how they differ from one area of the country to another. This could provide the basis for a selective entitlement program for critical skilled specialty needs in military-related and other industries.

This board would not serve as a central planning agency. It could, however, provide directions for focusing on training activities. Its primary responsibility would be to identify and designate certain areas of need or shortage, stimulate training to meet those needs and provide financial support to cover the costs of such training. The focus should be on responding to needs as they emerge rather than waiting until they have reached crisis proportions. The role of the board should in fact be a preventive one, helping to reduce the number of structurally unemployed workers and raise the human skills wealth of our nation.

The prototype of this approach is the G.I. Bill. The difference is that entitlements would be governed by national needs, not personal preferences. The entitlements could be used in private, public and on-the-job training programs.

The Human Resources Board could enhance the probability that an adequate supply of persons will be suitably trained to fill skilled jobs critical to the national welfare rather than leaving the fulfillment of these needs to chance and ill-informed judgments.

The establishment of this board would give new credibility to essential skilled and technical jobs in fields in which there is a need for workers.

Because our recommendation is subject to misunderstanding, we need to reiterate that we are trying to deal with the relatively expensive training of those who desire to acquire higher and more complex skills in certain specified areas, and that the areas will be determined by a national board. Eligible recipients of entitlements could include unemployed as well as experienced workers who need a higher level of skills.

In summary, vocational education programs can help solve the mismatch between the needs of the workplace and the skills of American workers. In communities across the country, vocational educators are providing customized training programs to help supply industry with the trained work force it needs. For workers displaced by structural changes within industry, vocational education programs are providing retraining to help those workers become productive again. Workers seeking entry into apprenticeship programs will find that vocational education can give them a start on the road toward journeyman status.

Yet current efforts must be expanded if this nation is to place a renewed emphasis on human capital formation. Unless this responsibility is accepted, new plans and improved technology will still not be able to bring about the necessary economic recovery.

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